Results and discussion

The observations indicated that the complex absorbs strongly at 500 nm, when the acidity of the reaction medium was kept in the range 2.0-7 M with hydrochloric acid. The mixed ligand complex was intensely coloured and stable for more than 70 hr in isobutyl methyl ketone.

Sodium cyclohexylxanthate (1 ml, 0.1%) and ammonium thiocyanate (1 ml, 5%) were sufficient for the maximum absorbance.

The mixed ligand complex was extractable in chloroform, isoamyl alcohol, ethyl acetate, butyl acetate, acetophenone, carbon tetrachloride and isobutyl methyl ketone. Since the maximum absorbance was observed in isobutyl methyl ketone, this solvent was chosen for further study.

The calibration curve was linear over the concentration range 2.4-14.5 ng of Mo(VI) in 10 ml of final solution. The molar absorptivity and the Sandell’s sensitivity were calculated to be $5.2 \times 10^{-1}$ mol$^{-1}$ cm$^{-1}$ and 0.0018 $\mu$g/cm$^2$ at 500 nm respectively.

For interference studies, the determination of molybdenum was carried out in the presence of various anions and cations. Li$^+$, Mg$^{2+}$, Ca$^{2+}$, Na$^+$, K$^+$, Ba$^{2+}$, Al$^{3+}$, La$^{3+}$, Sn$^{2+}$, Pb$^{2+}$, Ti$^{4+}$, Zr$^{4+}$, Cr$^{3+}$, Mn$^{2+}$, Fe$^{3+}$, Cl$^-$, Br$^-$, I$^-$, SO$_4^{2-}$, F$^-$, CO$_3^{2-}$, HCO$_3^-$, NO$_3^-$, NO$_2^-$, citrate, borate, oxalate, tartrate (20-25 mg) are tolerable.

Cyclohexyl xanthate reacts with copper, cobalt and nickel under neutral conditions but in acidic media these metal ions fail to react. The metal ions V(V) and W(VI) are tolerated in the presence of ascorbic acid.

Determination of molybdenum in steel alloys

The validity of the method was checked by the determination of molybdenum (VI) in steel alloys. A 1-2 g of the alloy sample was dissolved in 10 ml of hydrochloric acid by heating gently and then evaporating to dryness. The residue was dissolved in 5 ml of concentrated nitric acid and evaporated again to dryness. The residue was dissolved in 1-2 ml of 4 M hydrochloric acid and diluted to 100 ml in a standard flask. To an aliquot of this solution was added 1 ml of 10% ascorbic acid solution and determined by general procedure. The following values were obtained: BHO 501 (Mo 0.47%) gave 0.465% and BHO 502 (Mo 0.77%) gave 0.768% Mo (average of five determinations).
The proposed method has been found to be sensitive, selective and simple. There is no need of reducing agent, heating or pre-extraction. The sensitivity of the present method is comparable with other methods reported in literature\textsuperscript{4-13}.

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